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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/669,479	09/24/2003	Steven G. Goebel	GP-303584	3973
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CARY W. BROOKS General Motors Corporation Legal Staff, Mail Code 482-C23-B21 P.O. Box 300 Detroit, MI 48265-3000		EXAMINER HODGE, ROBERT W		
		ART UNIT PAPER NUMBER		
		1745		
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/669,479

Applicant(s)

GOEBEL ET AL.

Examiner

Robert Hodge

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 28 August 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 13-27, 29-32, 35 and 41 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13-27, 29-32, 35 and 41 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Response to Arguments*

Applicant's arguments filed 8/28/07 have been fully considered but they are not persuasive. The premise of the attorney remarks is that McLean does not teach different sized pitches for separate sides of the flow field plate and that the pitch is not constant from the inlet manifold to the outlet manifold. This is not persuasive because it is clear in figure 3 of McLean that two different pitches are taught for the anode and cathode separately and that the pitch is constant from the manifold inlet to the manifold outlet as shown by the other figures in the reference.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the motivation to combine is provided in the Non-Final Office Action dated 5/29/07 starting at the second paragraph of page 4 and continuing to page 5.

With respect to the claim objection, it was meant to be applied to claim 13 not claim 1 and applicants have made the proper correction to claim 13 and the objection is now withdrawn.

***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 13-22, 31 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,037,023 hereinafter Grehier in view of U.S. Patent No. 6,544,681 hereinafter McLean.

As seen in figures 9 and 11 Grehier teaches an electrochemical cell comprising a membrane electrode assembly (15 and E<sub>1</sub>-E<sub>5</sub>) defining anode and cathode sides that interposes respective flow field plates associated with them, wherein the flow field plates each have channels 14 that are substantially serpentine and are separated by lands and the lands are provided in a pattern of alternating angles and crests in a plane to both of said flow field plates, said pattern of lands being orientated relative to each other across the membrane electrode assembly (15 and E<sub>1</sub>-E<sub>5</sub>), such that the lands crisscross along said alternating angles and overlap on said crests (see also column 2, lines 25-27 and column 3, line 39 – column 4, line 11).

Grehier does not teach that a pitch defined by one flow field plate is great than a pitch of the other, or any other details outlined in the above listed dependent claims with regards to the pitch and cross-sectional dimensions, or that the fuel cell is a proton exchange membrane fuel cell.

McLean teaches a proton exchange membrane (PEM) type fuel cell system comprising a membrane electrode assembly (MEA) defining anode and cathodes sides, having a first flow field plate for the cathode side defined by first channels and lands, a

second flow field plate for the anode defined by second channels and lands with the MEA interposed between the first and second flow field plates, wherein the pitch of the first flow field plate is less than a pitch of the second flow field plate and said pitch defined by the second flow field plate is approximately twice as large as that defined by the first flow field plate, wherein a substantial number, majority and substantially all of the second lands have a cross sectional width wider than that of a substantial number, majority and substantially all of the first lands and this remains constant from the inlet manifold to the outlet manifold. McLean further teaches that the channels are either predominately straight or serpentine in orientation (abstract, figures 3, 4 and 8, column 1, line 14 – column 2, line 36, column 3, line 60 – column 4, line 57, column 6, line 50 – column 8, line 42). The Examiner notes that figure 3 is only one of many bipolar plates that are provided within the fuel cell stack and therefore since channels 34 are for Hydrogen and 36 are for Oxygen a MEA would be present on both sides of the plate and subsequent plates would be stacked respectively against the MEAs thereby providing multiple plates as required by the instant claims.

At the time of the invention it would have been obvious to one having ordinary skill in the art to optimize the pitches and cross-sections as well as providing a proton exchange membrane in Grehier as taught by McLean in order to provide a fuel cell that would be optimized by reducing the size of the flow field plate and reduce the amount of material required to manufacture the plate, thereby allowing for a more compact and lighter design, which is the intent of Grehier. It is also clear that Grehier is also concerned with optimizing the geometric configurations of the channels as outlined in

column 3, lines 54 et seq. It would have also been obvious to one having ordinary skill in the art at the time the invention was made to optimize the field flow plates of Grehier as taught by McLean since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art, in the absence of unexpected results. In re Boesch, 617 E.2d 272, 205 USPQ 215 (CCPA 1980).

Claims 23-27, 29, 30, 32 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grehier in view of McLean as applied to claim 13 above, and further in view of U.S. Pre-Grant Publication No. 2002/004158 hereinafter Suzuki.

Grehier as modified by McLean does not teach the specific dimensions recited in the above listed claims, the specific land-to-land alignment across the membrane electrode assembly or that the fuel cell is provided in a vehicle.

Suzuki teaches a proton exchange membrane fuel cell for an automobile comprising membrane electrode assemblies which have two field flow plates having a plurality of channels wherein a substantial number, a majority and substantially all of the channel widths are approximately equal wherein the channels are designed to be varied in shape and pattern, where the channels can be different sizes, and cross sectional areas that have the same specific dimensions as those claimed in the present application, as well as orienting lands in parallel planes at an angle from 0 to 90 degrees such that a land contact on both sides of the MEA is between 20% and 50% and the pitch of the channels can be varied (figures 3, 4 and 5 and paragraphs [0002], [0023]-[0026], [0056]-[0059], [0063], [0066]-[0070], [0078]-[0079] and [0084]). Suzuki

also teaches many different formulae for optimizing all of the dimensions of the field flow plates as can be seen throughout the entire disclosure.

At the time of the invention it would have been obvious to one having ordinary skill in the art to further optimize the dimensions of the flow field plates as well as their land-to land alignment across the membrane electrode assembly of Grehier as modified by McLean as taught by Suzuki in order to provide a fuel cell that would be further optimized by reducing the size of the flow field plate and reduce the amount of material required to manufacture the plate, thereby allowing for a more compact and lighter design, which is the intent of Grehier. As well as providing a fuel cell in a vehicle in order to replace the internal combustion engine that would in turn provide a vehicle that operates using clean energy and reducing pollutants released to the atmosphere. It would have also been obvious to one having ordinary skill in the art at the time the invention was made to optimize the field flow plates of Grehier as modified by McLean as taught by Suzuki since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art, in the absence of unexpected results. In re Boesch, 617 E.2d 272, 205 USPQ 215 (CCPA 1980).

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert Hodge whose telephone number is (571) 272-2097. The examiner can normally be reached on 8:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RWH



**JONATHAN CREPEAU**  
**PRIMARY EXAMINER**